



REMARKS

Claims 1, 3-8, and 18-28 are pending in this application. New claims 27 and 28 are supported in the original disclosure at, for example, page 9, lines 14-17. Applicant respectfully requests approval and entry of the new claims.

Claim Rejections -- 35 U.S.C. § 112

Claims 18 and 26 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite on the following ground:

The term “nonpolar polymer” is considered to be indefinite since it is not made clear what the term “nonpolar” is intended to encompass. While applicant exemplifies polyolefins as being nonpolar polymers, other polymers are also nonpolar but not included in the list such as polystyrene.

Applicant respectfully traverses this rejection.

Applicant respectfully submits that the term “nonpolar polymer” is widely used and well understood in the art. A search of the terms “nonpolar polymer” and “non-polar polymer” in the uspto.gov database revealed over 450 U.S. patents and over 200 U.S. patent applications using these terms. An expansion of the search to include the term “polar polymer” revealed over 1000 U.S. patents and over 500 U.S. patent applications. Clearly, this is not an instance in which Applicant has attempted to act as its own lexicographer or coined a new term without explanation.

Further, Section 112 does not place an obligation on Applicant to identify all possible species falling within a known genus. The designation of polyolefins as a sub-species and the identification of several species (e.g., polypropylene, ethylene-propylene copolymers) as exemplary polyolefins are consistent with the known meaning of the term

nonpolar polymers, and serve to reinforce the art accepted meaning of the term. Applicant respectfully submits that a person skilled in the art would have been able to ascertain the scope of the term “nonpolar polymer” in the same manner in which the Examiner was able to identify polystyrene as a nonpolar polymer. (Office Action, page 2, last paragraph) It is not the function of the specification to serve as either a dictionary providing known meanings for well known terms or a reference source naming all possible nonpolar polymers.

For these reasons, Applicant respectfully submits that the claims are in full compliance with Section 112. Withdrawal of the rejection is respectfully requested.

Claim Rejections -- 35 U.S.C. § 102

Claims 1, 3-8, and 18-26 have been rejected under 35 U.S.C. § 102(a) as being anticipated by Lebovitz et al, “Innovative Process for Compatibilizing Polymer Blends and Producing Well-Exfoliated Polymer Nanocomposites: Solid-State Shear Pulverization,” PMSE Preprints, 88, pp. 96-97 (hereinafter “PMSE Preprints”).

Applicant respectfully traverses this rejection.

At paragraph 3 of the Office Action, the Examiner stated that the above rejection would be reconsidered upon the grant or denial of Applicant’s petition under 37 C.F.R. § 1.78(a)(6) to accept an unintentionally delayed claim under 35 U.S.C. § 119(e) for the benefit of a prior filed provisional application. The petition was granted on May 4, 2006. The priority claim antedates the PMSE Preprints. Applicant respectfully requests that this rejection be withdrawn for the reasons advanced in the February 21, 2006 response.

Claims 1, 7, and 18 have been rejected under 35 U.S.C. § 102(a) as being anticipated by Lebovitz et al., “Innovative Process for Compatibilizing Polymer Blends and Producing Well-Exfoliated Polymer Nanocomposites: Solid State Shear Pulverization,” Abstracts of Papers, 225th ACS National Meeting, New Orleans, LA, March 27, 2003, American Chemical Society, PMSE-057 (hereinafter “ACS National Meeting Abstract”).

At paragraph 3 of the Office Action, the Examiner stated that the above rejection would be reconsidered upon the grant or denial of Applicant’s petition under 37 C.F.R. § 1.78(a)(6) to accept an unintentionally delayed claim under 35 U.S.C. § 119(e) for the benefit of a prior filed provisional application. The petition was granted on May 4, 2006. The priority claim antedates the ACS National Meeting Abstract. Applicant respectfully requests that this rejection be withdrawn for the reasons advanced in the February 21, 2006 response.

Claim Rejections -- 35 U.S.C. § 103

Claims 1, 3-8, and 19-25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2002/0165306 to Gilmer et al. in view of U.S. Patent No. 6,420,047 to Winckler et al.

Applicant respectfully traverses this rejection.

Independent claims 1 and 19 both recite that the clay of a polymer-clay mixture is exfoliated “through solid-state shear pulverization in the presence of cooling sufficient to maintain the mixture in the solid state during the pulverization.” The solid-state shear pulverization (SSSP) is performed, for example as described at page 14, lines 1-4 of the

specification, with a twin-screw pulverizer configuration. High levels of exfoliation and dispersion are achieved by processing in the mixture using SSSP.

In contrast, Gilmer discloses a process which practices chemical exfoliation by combining platelet particles with an oligomeric resin, which is mixed with the particles prior to polymerization. (See, for example, ¶ 0047 of Gilmer) Exfoliation of the platelet particles is carried out chemically via the *in situ* polymerization, e.g., chain extension, of the oligomeric resin in the presence of the platelet particles. Chemical exfoliation is discussed in the background section of the present patent application at page 5, which explains how *in situ* polymerization methods relying on chemical processes for exfoliation have found limited success, especially when practiced with nonpolar polymers.

Applicant respectfully submits that the Examiner's reference to the grinding step described in Example 20 Gilmer does not teach or suggest the SSSP step of the claimed invention. Gilmer does not teach or reasonably suggest the use of a screw or other shear pulverizer. Gilmer does disclose at paragraph 0109 that its grinding step is performed merely for the purpose of reducing the concentration of aggregates by decreasing the average particle size of the organoclay to, for example, less than 100 microns in diameter. Gilmer is devoid of any suggestion that this grinding step is intended to or reasonably could be expected to be carried out successfully to increase the exfoliation of the platelet particles.

Applicant further respectfully submits that Winckler, which has been cited for its alleged disclosure of grinding polyamide at a reduced temperature, does not overcome

the deficiencies of Gilmer. Neither Winckler nor the other art of record teaches a SSSP process for exfoliating clay.

For these reasons, reconsideration and withdrawal of the Section 103(a) rejection of claims 1, 3-8, and 19-25 is respectfully requested.

Claims 1, 3, 4, 6-8, 18-21, and 23-26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,500,892 to Bishop et al. in view of U.S. Patent No. 6,420,047 to Winckler et al.

Applicant respectfully traverses this rejection.

Applicant respectfully submits that Bishop is largely cumulative of Gilmer. Like Gilmer, Bishop does not mention or reasonably suggest the use of SSSP in order to effect exfoliation. Rather, example 4 of Bishop discloses mixing a polymer and clay together in a heated environment, then grinding the mixture. Bishop is devoid of any suggestion that this grinding step is intended to or reasonably could be expected to be carried out successfully to increase the exfoliation of the platelet particles. To the contrary, at column 5, lines 43-50, Bishop discloses that exfoliation is achieved by shearing forces experienced in melt blending. Although Bishop mentions a screw extruder, Bishop does so only in the context of melt extruding the polymer-clay mixture. The grinding operation presumably serves only to improve clay dispersion in the extruded product.

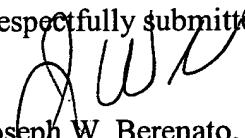
Applicant further respectfully submits that Winckler, which has been cited for its alleged disclosure of grinding polyamide at a reduced temperature, does not overcome the deficiencies of Gilmer. Neither Winckler nor the other art of record teaches a SSSP process for exfoliating clay.

For these reasons, Applicant respectfully requests reconsideration and withdrawal of the Section 103(a) rejection of claims 1, 3, 4, 6-8, 18-21, and 23-26.

Finally, Applicant has added new claims 27 and 28, which depend from claims 1 and 19, respectively, and recite that the solid-state shear pulverization is performed in a twin-screw pulverizer. Applicant respectfully submit that claims 27 and 28 incorporate all of the features of claims 1 and 19, respectively, and therefore are allowable for the above-discussed reasons, and for the additional reason that the applied art does not teach or reasonably suggest the use of a twin-screw pulverizer for effecting exfoliation.

If, after reviewing the above, the Examiner believes any issues remain unresolved, the favor of an Examiner interview is requested and the Examiner is requested to contact the undersigned, by telephone, to schedule the same.

Respectfully submitted,



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